REMARKS

Reconsideration of this application is respectfully requested in view of the foregoing amendment and the following remarks.

Claims 1-18 are pending in this application. Solely for formal reasons, claim 18 is amended. No claims are amended or cancelled. For the reasons stated below, Applicants respectfully submit that all claims pending in this application are in condition for allowance.

Claim Objections

The Examiner has objected to claim 18 as being drawn to a system, while depending from a method claim. Claim 18 is amended to overcome this objection. Thus, the Examiner is requested to remove this objection.

Claim Rejections

Claims 1-6, 8, 10-15, and 18 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent 5,243,298 to Runner ("Runner") in view of U.S. Patent 5,446,369 to Bryne et al. ("Bryne"). This rejection is traversed because there is no proper motivation to combine the references, and because Runner and Byrne, alone or in combination, do not teach all of the features of the claimed invention.

Independent claim 1 recites, among other things, placing a metallic element having a test portion and a reference portion in an environment in which the piece of equipment is located. Independent claim 8 includes similar subject matter, among other things. In an exemplary embodiment, a metallic element may be configured to have a test portion exposed to the

environment and a reference portion that is sealed from the conditions of the environment. *See* the specification at paragraph 13.

The Examiner admits that Runner fails to teach this reference portion. *See* the 7/05/2005 Office Action at page 4. However, the Examiner asserts that Byrne teaches a metallic conductor that includes a reference portion covered by a coating and a test portion that is exposed to the environment, thereby enabling detection of "very small incremental changes in the resistance of the test conductor." *See id.* at pages 4 and 5. Based on this teaching of Byrne, the Examiner maintains that it "would have been obvious...to provide the anode wire 10 taught by Runner with a test portion and a reference portion, similar to the metallic corrosion monitor taught by Byrne et al., since Byrne et al. discloses that the measurement of resistance changes in both a reference and a test conductor of a corrosion monitor allows very small incremental changes in the resistance of the test conductor to be detected." *See id.* at page 5.

A combination of multiple references in an obviousness rejection is proper "*only* if there is some suggestion or incentive to do so." *In re Sang Su Lee*, 277 F.3d 1338, 61 U.S.P.Q.2d 1430 (Fed.Cir. 2002) (emphasis in the original) (quoting *In re Fine*, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1600 (Fed. Cir. 1988) (quoting *ACS Hosp. Sys., Inc. v. Montefiore Hosp.*, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984))). In the instant case, the differences between the systems of Runner and Byrne, including the differences between the anode wire of Runner and the metallic conductor of Byrne, are such that no suggestion or incentive to combine the references in the manner proposed by the Examiner exists.

Runner appears to teach implementing an anode wire (element 10 in FIGS. 1-4) that is disposed inside an aircraft wing. *See* Runner at col. 4, lines 45-47. Runner specifies that a wire

should be used because a wire enables a large area to be covered with a minimal impact on weight. *See id.* at col. 4, lines 42-45. Runner further describes the wire as being formed of one or more elements that corrodes faster than the structure being monitored. *See id.* at col. 3, lines 15-23. In fact, as the Examiner acknowledges, the element(s) that forms the anode wire is selected such that the structure being monitored will remain undamaged even when all of the anode material has been consumed by corrosion. *See* the 7/05/2005 Office Action at page 3. Based on measured corrosion to the anode wire, a prediction is made with respect to an amount of time until the anode wire will be completely consumed. *See* Runner at col. 3, lines 55-57. When the amount of time until the anode wire will be completely consumed reaches a predetermined amount of time, the structure being monitored may be scheduled for maintenance. *See id.* at col. 3, lines 64-67. In some cases, the maintenance may be scheduled after the anode wire has been completely consumed. *See id.* at col. 3, line 67-col. 4, line 2.

On the other hand, Byrne apparently suggests employing a relatively compact metallic coupon (element 100 in FIG. 1) to monitor corrosion of a structure. *See* Byrne at col. 1, lines 33-35. Byrne expressly teaches that the coupon should be formed of the same material as the structure being monitored. *See id.* Therefore, in order to detect small amounts of corrosion in the structure being monitored, the system of Byrne must be capable of detecting small amounts of corrosion in the coupon. Byrne teaches that providing one half of the coupon (element 102 in FIG. 1) exposed to the environment, and another half of the coupon (element 104 in FIG. 1) sealed from the environment by a protective coating (element 108 in FIG. 1) enables the system to detect "extremely small" percentage changes in the resistance of (and corresponding

extremely small amounts of corrosion in) the exposed half of the coupon. *See id.* at col. 1, lines 37-45; and col. 4, lines 18-28.

At least one difference between the system of Runner and the system of Byrne is the composition of the anode wire of Runner and the composition of the coupon of Byrne. As the Examiner highlights at pages 4 and 5 of the 7/05/2005 Office Action, Byrne expressly teaches providing a coupon including a covered half and a half exposed to the environment in order to detect "very small changes in the resistance of the test conductor." However, since the anode wire of Runner is made of a material that corrodes at a substantially faster rate that the structure being monitored, detecting "very small changes" in the anode wire would not provide an incentive to modify the system of Runner in the manner proposed by the Examiner. Therefore, the motivation for combining the references provided by the Examiner is improper and for at least this reason the rejection should be withdrawn.

Additionally, assuming *arguendo* that detecting extremely small amounts of corrosion in the anode wire of Runner provided some incentive for modification, the structural differences between the anode wire of Runner and the coupon Byrne teach away from modifying the anode wire of Runner in the manner proposed by the Examiner. References that teach away from combination cannot be used to establish a *prima facie* case of obviousness. *McGinley v. Franklin Sports, Inc.*, 262 F.3d 1339, 60 U.S.P.Q.2d 1001 (Fed.Cir. 2001).

More specifically, the anode wire of Runner is depicted as a thin wire (diameter < .005 inches), long enough to cover a broad area within a wing of an aircraft. *See* Runner at col. 4, lines 38-53; and at FIGS. 1 and 2. In contrast, Byrne describes a relatively small coupon that is formed as a flat, substantially rectangular member that includes a reference portion encased in a

protective cover, and a test portion that is also encased in the protective cover except for one side, which is open to the environment. *See* Byrne at col. 3, lines 33-53. Byrne does not give any guidance for providing a long piece of metal about .005 inches in diameter, such as the anode wire of Runner, with a test portion and a reference portion. If the wire of Runner was partially encased in a protective cover and/or additional wire were added to the wire to provide the anode wire with a test portion and a reference portion, the susceptibility of the wire of Runner to corrosion would be impeded and additional weight would be added. Both of these effects run contrary to the teachings of Runner. *See* Runner at col. 3, lines 15-30. If the wire of Runner were replaced with a conductor that structurally resembled the coupon of Byrne, the area covered by the conductor would be significantly reduced. Thus, only a small portion of the aircraft would be monitored. This also runs contrary to the express teachings of Runner. *See id.* Thus, the structural differences between the anode wire of Runner and the coupon of Byrne teach away from their combination. For at least this reason the rejection is improper and should be withdrawn.

Claims 2-6, 10-15, and 18 depend from corresponding ones of independent claims 1 and 8, and therefore, are allowable based on their dependency as well as for the features that they add to the independent claims.

For example, with respect to dependent claims 4, 12, and 13, claim 4 recites, among other things, wherein the amount of corrosion is compared to an expected amount of corrosion, and a resulting comparison result of the amount of corrosion and the expected amount of corrosion is used to determine the maintenance schedule for the equipment. Claims 12 and 13 include similar subject matter, among other things. In an exemplary embodiment, a calculated amount of

corrosion may be compared with a value of corrosion that is determined via a look-up table that uses measured temperature and/or humidity information to generate an expected amount of corrosion. *See* the specification at paragraph 23.

The Examiner asserts at page 5 of the 7/05/2005 Office Action that it "would have been obvious...to compare the amount of corrosion detected with the measuring device 22 taught by Runner with an expected amount of corrosion so as to determine if the aircraft is subjected to more or less of a corrosive environment than expected, and to perform costly maintenance on the aircraft only on an as-needed basis." However, the Examiner provides no support for this assertion. Applicants surmise that the Examiner is taking Official Notice with respect to both the proposed modification of the system of Runner, and the motivation for the modification. Accordingly, Applicants hereby challenge the factual assertion as not properly Officially Noticed, and demand that the Examiner support the finding with adequate evidence. In the absence of such evidence, the rejection of these claims should be withdrawn.

With respect to claims 5-7 and 14-16, claim 5 recites, among other things, wherein determining the amount of corrosion experienced by the metallic element is validated based on conditions of the environment. Claims 6, 7, and 14-16 include similar subject matter, among other things. In an exemplary embodiment, a calculated amount of corrosion may be compared with a value of corrosion that is determined via a look-up table that uses measure temperature and/or humidity information to generate an expected amount of corrosion. Based on the comparison, the calculated value of corrosion may be used or ignored. *See* the specification at paragraph 23.

The Examiner admits that Runner does not teach this validation of a calculated corrosion amount, but relies on Byrne for a suggestion of this feature. *See* the 7/05/2005 Office Action at pages 5 and 6. However, Byrne does not teach or suggest this feature. What Byrne does teach is that since the reference portion of the metallic coupon is completely encased in the protective cover, the reference portion may heat up faster than the test portion of the coupon when a current is applied to them. This may be caused by the fact that heat generated by the current may be unable to dissipate through the protective cover. *See* Byrne at col. 4, lines 44-47. Since increases in temperature in the coupon may result in an increase in resistivity, this temperature difference between the reference portion and the test portion of the coupon may lead to incorrect measurements of corrosion unless corrective action is taken. *See id.* at col. 4, lines 47-51. To compensate for the temperature difference, measurements are taken of the temperatures of the reference portion and the test portion. *See id.* at col. 4, line 63-col. 5, line 6. In other words, Byrne describes measuring the temperatures of the reference and test portions of the coupon to compensate for changes in the resistivity of the portions of the coupon caused by a temperature difference between the two portions in determining a corrosion amount. Byrne does not teach or suggest validating a calculated corrosion amount based on conditions of the environment. Accordingly, the rejection of these claims is improper and should be withdrawn.

Claims 7 and 16 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Runner in view of Byrne, and in further view of U.S. Patent No. 6,623,616 to Malver *et al.* ("Malver"). This rejection is traversed at least because there is no proper motivation for

combining the cited references, and because the references do not teach or suggest all of the features of the claimed invention.

The Examiner admits that Runner and Byrne do not teach validating a calculated amount of corrosion based on a humidity of the environment, but relies on Malver for a suggestion of this feature. *See* the 7/05/2005 Office Action at pages 6. Malver apparently describes a monitoring method and system to monitor an environment in which an object is located includes monitoring one or more environmental factors. *See* Malver at the Abstract. However, Malver does not remedy the deficiencies of Runner and Byrne addressed above. Accordingly, this rejection is improper and should be withdrawn.

Claim 17 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Runner in view of Byrne, and in further view of U.S. Patent No. 5, 196,075 to Jansen *et al.* ("Jansen"). This rejection is traversed because there is no proper motivation for combining the cited references, and because the references do not teach or suggest all of the features of the claimed invention.

The Examiner admits that Runner and Byrne do not teach or suggest that the anode wire of Runner be made from carbon steel, but relies on Jansen for a suggestion of this feature. *See* the 7/05/2005 Office Action at pages 6. Jansen appears to describe a method for making workpieces of ferritic steel. *See* Jansen at the Abstract. However, Jansen does not remedy the deficiencies of Runner and Byrne addressed above. Accordingly, this rejection is improper and should be withdrawn.

In view of the foregoing, all of the claims in this case are believed to be in condition for allowance. Should the Examiner have any questions or determine that any further action is desirable to place this application in even better condition for issue, the Examiner is encouraged to telephone Applicants' undersigned representative at the number listed below.

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Respectfully submitted,

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